Digestion Systems
Digestion systems from Buchi – extensive selection

To determine the nitrogen or protein content in accordance with the Kjeldahl method, it is necessary, in the majority of cases, to digest the related samples using sulfuric acid and a catalyst. Digestion systems utilizing a block heater or an IR heater can be used for this procedure.

The right digestion system for every need

- **Usage in foodstuff, animal feed, environment, pharmaceutical laboratories**
  The nitrogen or protein content is an important parameter during the analysis of a wide range of samples. The digestion systems from Buchi can be used universally for every application.

- **Compliance with standard methods using Buchi block digestion systems**
  To analyze nitrogen/protein in accordance with officially recognized methods (ex. AOAC, DIN, ISO), block digestion systems are the first choice. In these methods the use of block digestion systems is often recommended.

- **Shortening of the digestion procedure using Buchi IR digestion systems**
  Fast pre-heating and cool-down are the key feature of IR digestion systems. For this reason it is possible to significantly shorten the entire digestion process and at the same time increase the sample throughput.
Block digestion - automation and ease of use

Digestion systems based on a heated aluminum block are widely known and are recommended in many official methods. With many years of experience in this sector, Buchi offers three aluminum block digestion systems. These systems offer varying degrees of automation and ease of use.

Digest System K-437:
most convenient digestion system
A complete instrument for the safe digestion of up to 20 samples simultaneously. The samples tubes are evenly heated and all of the acid fumes are collected with the aid of the optional B-414 Scrubber. Digestion temperature and time can be programmed and viewed on the display at all times.

- Undertake standard Kjeldahl digestions on 20 samples in 300 ml sample tubes at the same time
- Simple operation
- Exact temperature during digestion is displayed
- Countdown time indicator is displayed
- All glassware is made of Buchi high quality, borosilicate glass
Digest Automat K-438/Digest Automat K-432: highest degree of automation
The models K-438 and K-432 are additionally equipped with an automatic lift for raising and lowering the rack; they also have a feature that allows methods to be programmed and saved. As a result the digestion process is completely automated. Temperature profiles can be entered so that highly foaming or otherwise difficult samples can be digested more easily. If the Digest Automat is connected to a K-370 Distillation Unit, it is possible to initiate the digestion via the K-370, to export methods to a PC and to print them out. The rack holding the samples can be placed directly in the Autosampler K-371.

- Increased convenience on the digestion of up to 20 samples in 300 ml sample tubes (K-438) or 12 samples in 500 ml sample tubes (K-432)
- Automatic lift for the raising and lowering of the sample rack
- Programmable temperature profile with 4 temperature steps and cool-down
- Data transfer to K-370
- Working memory for 9 programs for different sample matrices
- Built-in clock to start the digestion at a previously defined time

Advantages of Buchi Block digestion:
- Automation reduces time the user needs to be present
- Ease of use makes routine operation easier
- Compliance with official standards (AOAC, DIN, ISO)
SpeedDigester - flexibility, speed, reproducibility

Using the SpeedDigester IR digestion systems, new standards are set in speed of digestion, flexibility and reproducibility. Using these systems, a wide range of samples can be digested much faster compared to conventional digestion systems. The SpeedDigester K-439 is also the world’s first IR digestion system with temperature control, so that exact temperatures can be set.

- **SpeedDigester K-425/K-436:** cost-optimized flexibility
  On these two systems the heating level is adjusted using continuous controls. The optimized design of the heating chambers reliably ensures all samples are homogeneously heated, an aspect that prevents the foaming of critical samples. The acid fumes produced are removed with the aid of the optional Scrubber B-414. As a consequence the ambient air in the laboratory remains free of harmful vapors.

- **K-425:** 6 x 300 ml or 5 x 500 ml sample tubes
- **K-436:** 12 x 300 ml or 10 x 500 ml sample tubes
- **K-436:** two heating chambers that can be controlled individually
- **Simultaneous and even boiling of all samples**
- **Fully sealed suction system for the removal of acid fumes**
World innovation SpeedDigester K-439: perfect reproducibility thanks to temperature control

The SpeedDigester K-439 is revolutionizing Kjeldahl digestion. It is the only IR digestion system that has an integrated temperature sensor, so that digestion at exact temperatures is achievable. The advantages of IR and block heating systems are now combined. Using modern application software, digestion methods (temperature ramps and time) can be programmed and saved in the database with a method name. The SpeedDigester K-439 also features an LC display which allows the user to observe the progress during a digestion as a graphical display.

- 12 x 300 ml or 10 x 500 ml sample tubes.
- Fast heating and cooling result in significant time savings and as a consequence increased sample throughput.
- Exact temperature control makes it possible to set temperatures; an aspect that contributes to excellent reproducibility.
- 20 pre-defined Buchi digestion methods and 30 individually programmable methods ease routine operation.
- If a scrubber is connected, it is automatically switched on at the start of the digestion and off again at the end of digestion.

Advantages of Buchi IR digestion:
- Time savings due to short heat-up and cool-down times
- Reproducibility thanks to integrated temperature control
- Use of 300 or 500 ml tubes with the same instrument
SpeedDigester – outstanding features

Selection of sample tubes
Tubes with a volume of 300 ml or 500 ml
→ Optimal sample tube for every application

Special suction manifolds
Standard: universal use
Condensate trap: aqueous samples
→ Efficient digestion due to reduced condensation backflow
H₂O₂-digestion: digestion without catalyst
→ Fast, environment friendly

Homogeneous heat distribution
All sample positions are evenly heated
→ Consistent start of boiling

Optimal sealing
Special sealing system between sample tube and suction manifold
→ No unpleasant odors

Fast heating/cooling
Integrated, powerful IR heater
→ Enormous time saving

Easy to use software
Programming of digestion methods
→ Easy programming

Clear display
Large LC display with graphic function
→ Increased ease of use

Exact temperature control
Sensor ensures temperatures set are maintained
→ Perfect reproducibility

Predefined applications
20 Buchi standard methods, 30 individually programmable methods
→ Simplified routine operation

Detailed IQ/OQ documentation
Installation qualification and operational qualification
→ Fast qualification
Configurations, block digestion systems

All block digestion systems are supplied complete with sample tubes, rack, suction module and hose to the scrubber.

<table>
<thead>
<tr>
<th>Model</th>
<th>Order no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digest Automat K-432</td>
<td>043980</td>
<td>Standard suction manifold, 12 x 500 ml tubes (220–240 VAC, 50/60 Hz)</td>
</tr>
<tr>
<td>Digest Automat K-432</td>
<td>043074</td>
<td>Suction manifold with condensate brake, 12 x 500 ml tubes (220–240 VAC, 50/60 Hz)</td>
</tr>
<tr>
<td>Digest System K-437</td>
<td>038584</td>
<td>Standard suction manifold, 20 x 300 ml tubes (220–240 VAC, 50/60 Hz)</td>
</tr>
<tr>
<td>Digest System K-437</td>
<td>040316</td>
<td>Suction manifold with condensate brake, 20 x 300 ml tubes (220–240 VAC, 50/60 Hz)</td>
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<tr>
<td>Digest Automat K-438</td>
<td>038520</td>
<td>Standard suction manifold, 20 x 300 ml tubes (220–240 VAC, 50/60 Hz)</td>
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<td>Digest Automat K-438</td>
<td>040317</td>
<td>Suction manifold with condensate brake, 20 x 300 ml tubes (220–240 VAC, 50/60 Hz)</td>
</tr>
</tbody>
</table>

Configurations, SpeedDigester (IR digestion)

All IR digestion systems are supplied complete with sample tubes, rack, suction module and hose to the scrubber.

Instrument model

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
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<tbody>
<tr>
<td>425</td>
<td>SpeedDigester K-425</td>
</tr>
<tr>
<td>436</td>
<td>SpeedDigester K-436</td>
</tr>
<tr>
<td>439</td>
<td>SpeedDigester K-439</td>
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</tbody>
</table>

Supply voltage

1. 110–120 VAC (only for K-425)
2. 220–240 VAC (for K-425/436/439)

Suction module

1. 300 ml tubes standard
2. 300 ml tubes condensate trap
3. 300 ml tubes H₂O₂
4. 250 ml tubes from other manufacturers
5. 500 ml tubes condensate trap
There is an increased demand for laboratory instruments to be qualified to ensure that applicable directives or standards (GLP/GMP) are met. The installation qualification and operational qualification play a central role to ensure that a specific measuring accuracy or reproducibility is achieved and documented. Buchi offers complete IQ/OQ packages.

**IQ/OQ documentation**

IQ/OQ package for Digest System K-437 and Digest Automat K-432/438

All Buchi block digestion systems have temperature control. The temperature reached is checked using a reference sensor via three holes in the heating block. The complete package for the qualification includes:

- IQ- and OQ dokumentation
- IQ sticker and OQ labels
- Test connector for scrubber interface
- Instrument log book
- Various certificates

World innovation:

IQ/OQ package for the IR digestion system SpeedDigester K-439

The new SpeedDigester K-439 is the first IR digestion system with temperature control. Temperatures set can be verified using a reference sensor. The qualification package includes:

- IQ- and OQ dokumentation
- IQ sticker and OQ labels
- Adapter for positioning the reference sensor
- Cover for the heating chamber
- Instrument log book
- Test connector for scrubber interface
- Various certificates

**Optional accessories**

**General accessories**

<table>
<thead>
<tr>
<th>Item</th>
<th>Order no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glass caps for occupying empty sample positions, 4 pieces</td>
<td>040049</td>
<td></td>
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<tr>
<td>Water jet pump</td>
<td>002913</td>
<td></td>
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<tr>
<td>Connection cable to the scrubber for switching on/off via digestion system (not for K-425/436)</td>
<td>014738</td>
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<tr>
<td>Kjeldahl tablets, 250 pieces</td>
<td>028765</td>
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<tr>
<td>Sample tubes 300 ml, 4 pieces</td>
<td>037377</td>
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<td>Sample tube 500 ml (SpeedDigester and K-432)</td>
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<tr>
<td>4 pieces</td>
<td>043982</td>
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Accessories K-432/437/438

- Accessories for COD determination in accordance with DIN/ISO methods (K-437/438)
- Digestion rods to prevent bumping, 10 pieces
- Retainer plate for cleaning tubes in the 20-position rack
- Holder for 12/20-position rack
- Drip tray for aluminum block
- Suction tube with condensate trap

Order no. 043960 043087 038559 038639 040056 K-437/438 039640 K-432 043072

Scrubber (other models on request)

- Cover for 12/20 position rack
- Additional block for additional insulation (K-437/438)
- Connection cable K-432/K-438 to K-370 for data transfer
- IQ/OQ set
- Scrubber B-414 with neutralization and adsorption stage
- Scrubber B-414 with additional condensation stage

Order no. 040052 040088 043109 K-437 11057092 K-432/438 11055963 230V, 50Hz 037876 120V, 60Hz 037877 230V, 50Hz 037882 120V, 60Hz 037883

Accessories K-425/436/439

- Suction module for H₂O₂ digestion of foaming samples
- Suction tube with condensate trap
- Reflux Digestion System
- Holder for 6/12 sample tubes
- Rack for 6 sample tubes
- Rack for 5 sample tubes

Order no. 300 ml 11055853 500 ml 11055851 Order no. 11056853 6x300 ml 043039 12x300 ml 043041

Order no. 500 ml 11056966 Order no. Base 11056612

- IQ/OQ set K-439
- Bed-plate for 6-position rack for raising sample tubes
- Drip tray for suction manifold
- Cover for heating chamber for fast preheating
- Insulation cap for unoccupied positions
- Insulation plate

Order no. 11056167 11055943 11055216 11055842 11056024 11055142 500 ml 11055143
### Technical data

#### Block digestion systems

<table>
<thead>
<tr>
<th>Model</th>
<th>Digest Automat K-432</th>
<th>Digest System K-437</th>
<th>Digest Automat K-438</th>
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<tbody>
<tr>
<td>Operating voltage</td>
<td>220–240 VAC</td>
<td>220–240 VAC</td>
<td>220–240 VAC</td>
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<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
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<tr>
<td>Power consumption</td>
<td>2200 W</td>
<td>2200 W</td>
<td>2200 W</td>
</tr>
<tr>
<td>Weight (net)</td>
<td>36 kg</td>
<td>29 kg</td>
<td>36 kg</td>
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<tr>
<td>Dimensions (WxHxD)</td>
<td>435 x 565 (780) x 560 mm</td>
<td>435 x 565 (780) x 535 mm</td>
<td>435 x 565 (780) x 560 mm</td>
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<tr>
<td>Temperature range</td>
<td>50–420 °C (450 °C)</td>
<td>50–420 °C (450 °C)</td>
<td>50–420 °C (450 °C)</td>
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<tr>
<td>Temperature error</td>
<td>± 5 °C &gt; 200 °C</td>
<td>± 5 °C &gt; 200 °C</td>
<td>± 5 °C &gt; 200 °C</td>
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<tr>
<td>Max. number of samples</td>
<td>12 samples (500 ml tubes)</td>
<td>20 samples (300 ml tubes)</td>
<td>20 samples (300 ml tubes)</td>
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<td>Approval</td>
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<tr>
<td>IP class</td>
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#### SpeedDigester systems

<table>
<thead>
<tr>
<th>Model</th>
<th>SpeedDigester K-425</th>
<th>SpeedDigester K-436</th>
<th>SpeedDigester K-439</th>
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<tr>
<td>Operating voltage</td>
<td>110–120 VAC/220–240 VAC</td>
<td>220–240 VAC</td>
<td>220–240 VAC</td>
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<td>Frequency</td>
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<tr>
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<td>2000 W</td>
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<td>Weight (net)</td>
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<td>310 x 540 x 620 mm</td>
<td>310 x 540 x 620 mm</td>
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<td>Temperature range</td>
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<td>70–580 °C</td>
<td>50–580 °C</td>
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<tr>
<td>Temperature error</td>
<td>/</td>
<td>/</td>
<td>± 5 K at 200 °C</td>
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<td>Max. number of samples</td>
<td>6 samples (300 ml tubes)</td>
<td>12 samples (300 ml tubes)</td>
<td>12 samples (300 ml tubes)</td>
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<tr>
<td>IP class</td>
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